



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,318	03/10/2005	Hideki Matsuda	027667-00001	9560
4372	7590	11/13/2007	EXAMINER	
ARENT FOX LLP			YANG, JIE	
1050 CONNECTICUT AVENUE, N.W.			ART UNIT	
SUITE 400			PAPER NUMBER	
WASHINGTON, DC 20036			1793	
			NOTIFICATION DATE	DELIVERY MODE
			11/13/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DCIPDocket@arentfox.com
IPMatters@arentfox.com
Patent_Mail@arentfox.com

Office Action Summary	Application No.		Applicant(s)	
	10/527,318		MATSUDA ET AL.	
	Examiner		Art Unit	
	Jie Yang		1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/23/2006;3/16/2006;3/10/2005</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is to acknowledge of the receipt of "applicant argument/remarks" filed on 03/10/2005. Claim 5 is amended from original claim, Claims 8-10 are added, and Claims 1-10 are pending in application. Regarding the IDS marked 03/10/2005, the NPL reference (metal data book) is crossed out since no copy is provided in the IDS.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yiu Chen et al (NPL: "Study on microstructure and properties of softnitriding layer in the several steels", Tianjin Metallurgy, Tianjin Inst. Of Technology; No.4: 2000; pages 9-12, thereafter NPL-1).

Regarding claims 1 and 6, NPL-1 teaches several steels having surface hardened by nitriding, as claimed in the instant claim (Title of NPL-1). The alloy composition and parameters of surface nitriding treatment are ~~optimizing~~ result-effective variables in term of Vickers hardness of surficial portion and distribution of hardness along depth profile, which is evidenced by NPL-1. NPL-1 teaches the hardness distribution curve along

Art Unit: 1793

depth profile of three different steels after softnitriding treatment and similar Vickers hardness distribution has been obtained as claimed in the instant claims. Therefore, it would have been obvious to one skilled in the art to have optimized composition of alloy and parameters of surface nitriding treatment in order to obtain desired Vickers hardness distribution, for example, 340 to 460 HV at 50 μ m from surface; 190 to 260 HV at inner portion; and having effective depth 0.3mm with 270 HV, as claimed in the instant claims. See MPEP 2144.05 II.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over NPL-1 as evidenced by Ishida et al (US 6,599,469, thereafter '469).

Regarding claim 5, crank shaft is an intended use of the soft nitriding technique, which is evidenced by '469. '469 teaches steel after soft nitriding is suitable for the long materials like shafts and crankshafts (Col.5, lines 12-33 of '469). See MPEP 2111.02 II.

Claims 2-4, 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over NPL-1 and in view of Ishida et al (US 6,599,469, thereafter '469).

Regarding claims 2-4 and 7, NPL-1 teaches limitations of claim 1, but NPL-1 does not explicitly teach the mechanical component having composition range as claimed in the instant claims. '469 teaches a non-heat treated steel for soft nitriding (Abstract of '469). The compositions of the instant invention and '469 are listed in following table. All the composition ranges disclosed by '469 (Abstract and Col.2, line3- Col.5, line 4 of '469) overlap the composition ranges of the instant invention, which is a prima facie case of obviousness. SEE MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to select the claimed compositions C, Si, Mn, Cu, Ni, Cr, Al, N, and to add one or more from Pb, S, Ca, Bi, Ti from the composition disclosed by '469 in the process of NPL-1, because '469 discloses the same utility throughout the disclosed ranges.

Element	From instant Claim 3 (in wt%)	'469 (in wt%)	Overlapping range (in wt%)
C	0.35-0.5	0.2-0.6	0.35-0.5
Si	0.01-0.3	0.05-1.0	0.05-0.3
Mn	0.6-1.8	0.25-1.0	0.6-1.0
Cu	0.01-0.5	0-0.30	0.01-0.3
Ni	0.01-0.5	0-0.20	0.01-0.2
Cr	0.01-0.5	0-0.2	0.01-0.2

Art Unit: 1793

Al	0.001-0.01	0-0.045	0.001-0.01
N	0.005-0.025	0.005-0.025	0.005-0.025
optional	From instant claim 4		
Pb	0-0.30	0.01-0.40	0.01-0.30
S	0-0.20	0.03-0.2	0.03-0.2
Ca	0-0.01	0.0005-0.005	0.0005-0.05
Bi	0-0.30	0.005-0.40	0.005-0.30
Ti	0-0.02	0.002-0.01	0.002-0.01
Fe	Balance	Balance	Balance

Regarding the equations in the instant claims 2 and 7, the Cr[eq.], C[eq.], H'_0 , H'_1 and α depend on the alloy compositions as recited in the instant claims; The parameters D and Q depend on nitriding temperature; Vickers hardness $H'(x)$ depends on nitriding process time t, α , D, H'_0 , and H'_1 . '469 teaches soft nitriding at 580°C for 1.5 and 5 hrs (Col.6, lines 7-34 of '469), which is within the 500-650°C and 3.6×10^3 to 18×10^3 seconds ranges as claimed in the instant claims. It is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D.357, 553 O.G.177; 57 USPQ 117, Taklatwalla v. Marburg. 620 O.G.685, 1949 C.D.77, and In re Pilling, 403 O.G.513, 44 F(2) 878, 1931 C.D.75. In the instant case, in the absence of evidence to the contrary, the selection of the proportions of elements, C, Si, Mn, Cu, Ni, Cr, Al, N; optionally select Pb, S, Ca, Bi, Ti; nitriding temperature and time from '469 in order to get the $H'(x)$ value to meet claimed equation would appear to require no more than routine

Art Unit: 1793

investigation by those ordinary skilled in the art. In re Austin, et al., 149 USPQ 685, 688.

Regarding claims 8-10, '469 teaches steel after soft nitriding is suitable for the long materials like shafts and crankshafts (Col.5, lines 12-33 of '469). See MPEP 2111.02 II.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

(JY)

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1793